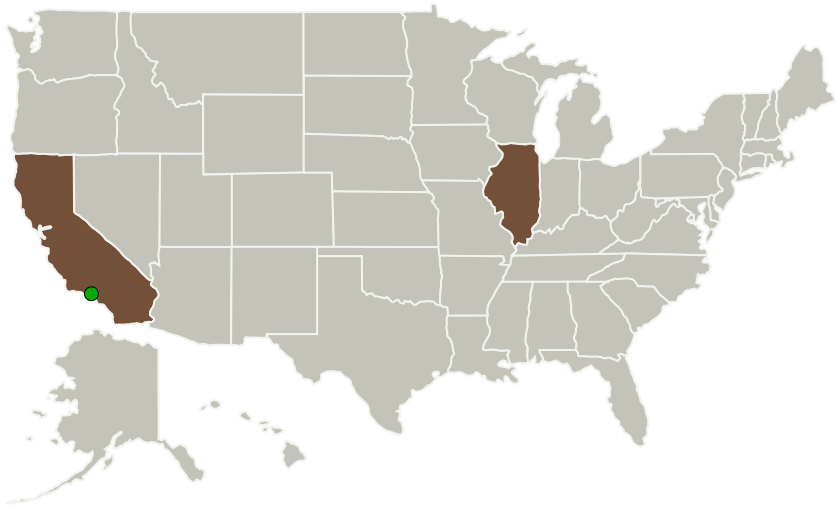
Micro GC's for Contaminant Monitoring in Spacecraft Air, Phase II

Completed Technology Project (2011 - 2013)

Project Introduction

Based on the successful separation of 20 compounds using a 1 m coated microcolumn in Phase I, we propose to design a new micro-gas chromatograph (microGC) system to separate and detect of all contaminants listed in NASAs "Spacecraft Maximum Allowable Concentrations for Airborne Contaminants (SMACs)" using cabin air as the carrier gas, and to integrate the entire system to maximize the detection of the contaminants with high-sensitivity and accuracy. In order to attain these goals, we will use three sets of preconcentrators, columns, and detectors in parallel, each with the appropriate selectivity for a given class of gases. Light gases will use a packed column, and polar and non-polar gases with their respective stationary phases. The prototype micro-GC/FID will comprise preconcentrators with fast injection valves, microcolumns to separate different gas analytes, an air sampling pump, a water-hydrolysis hydrogen generator to provide enough oxygen and hydrogen for a micro-flame ionization detector, thermal management, controls and circuit board to drive the system.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Cbana Laboratories	Lead Organization	Industry Women-Owned Small Business (WOSB)	Champaign, Illinois
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations	
California	Illinois

Project Transitions

June 2011: Project Start

November 2013: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139091)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Cbana Laboratories

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Byunghoon Bae

Co-Investigator:

Byunghoon Bae

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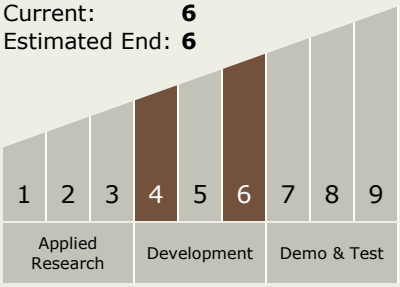
Technology Maturity (TRL)

Start: **4**
Current: **6**
Estimated End: **6**



Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.4 Environmental Monitoring, Safety, and Emergency Response
    - TX06.4.1 Sensors: Air, Water, Microbial, and Acoustic

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System